

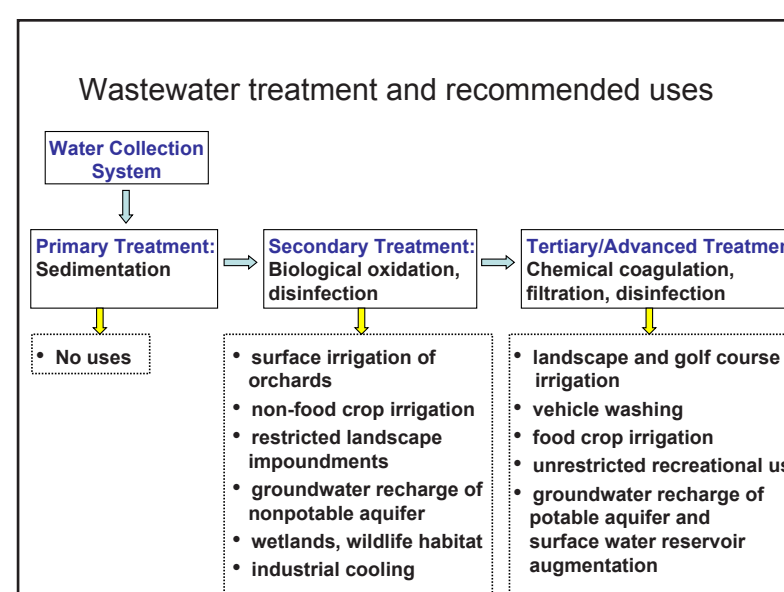
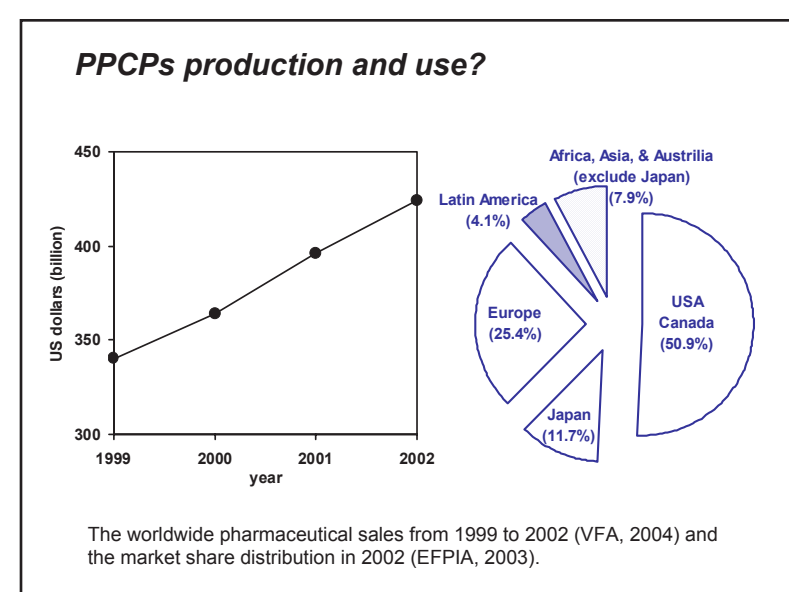
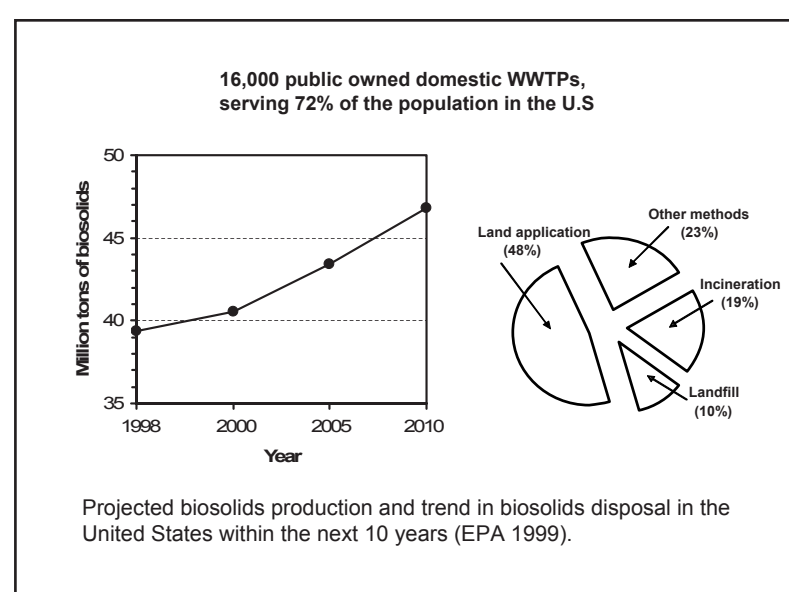
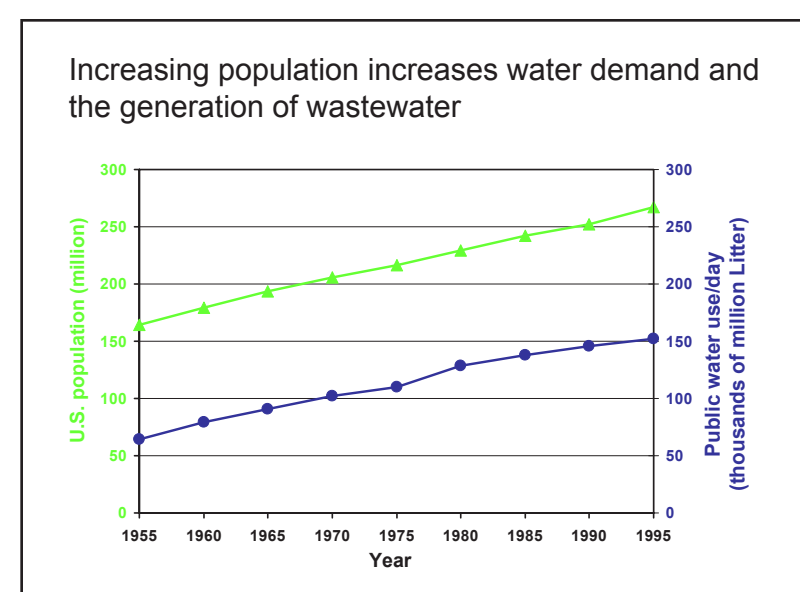
# Exposure Assessment of Contaminants Associated with Reclaimed Water and Biosolids

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## Background:

- **Population increases are driving the more frequent use of recycled materials, such as reclaimed water (wastewater) for irrigation and biosolids for fertilizer and soil amendments.**
- **Pharmaceuticals and Personal Care Products (PPCPs) and endocrine disrupting chemicals (EDCs) have been measured in both reclaimed water and biosolids.**
- **PPCPs and EDCs have been detected in aquatic environments receiving wastewater effluent.**
- **Proactive methods are needed to assess exposure and risk to aquatic ecosystems to these contaminants.**



## Hypothesis:

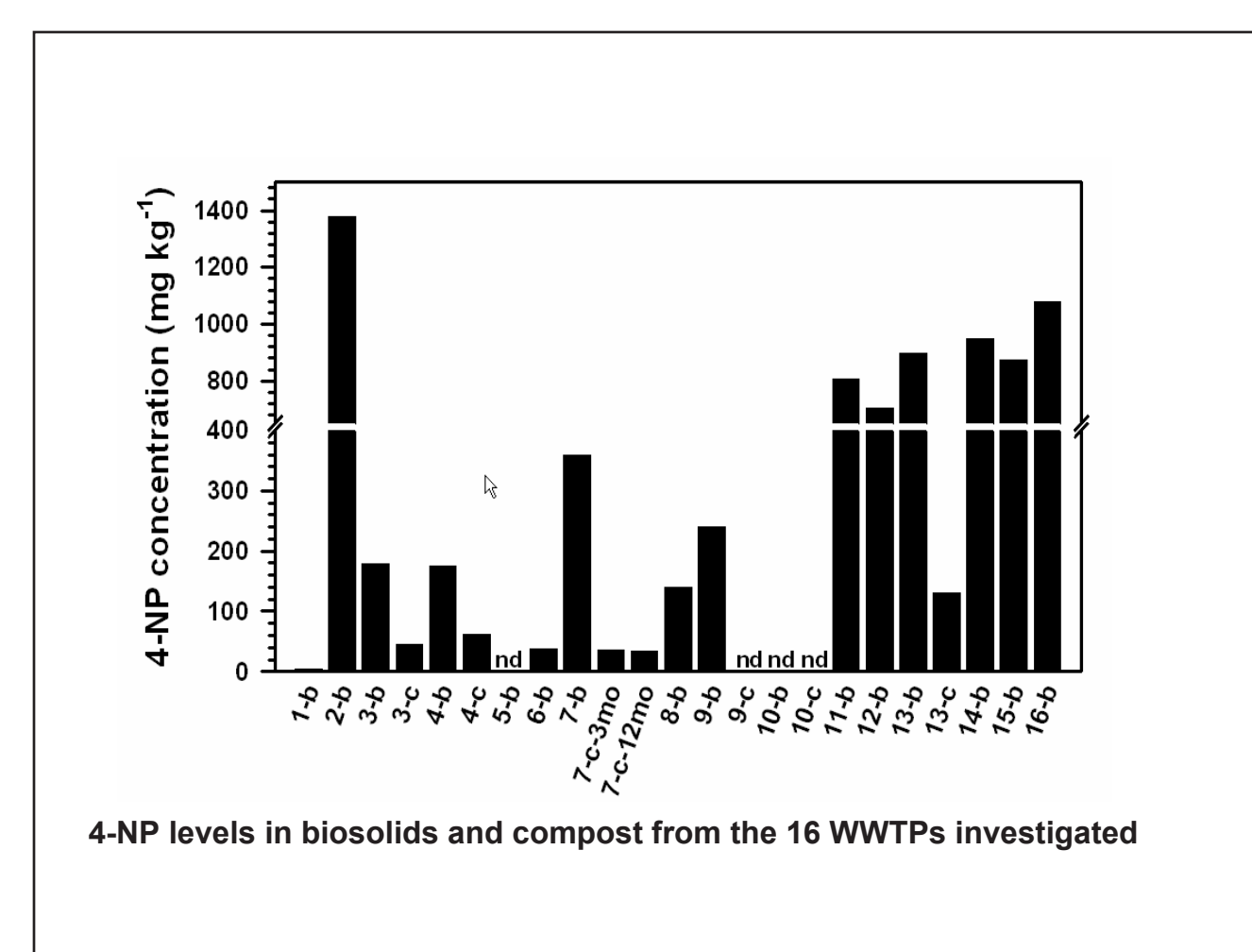
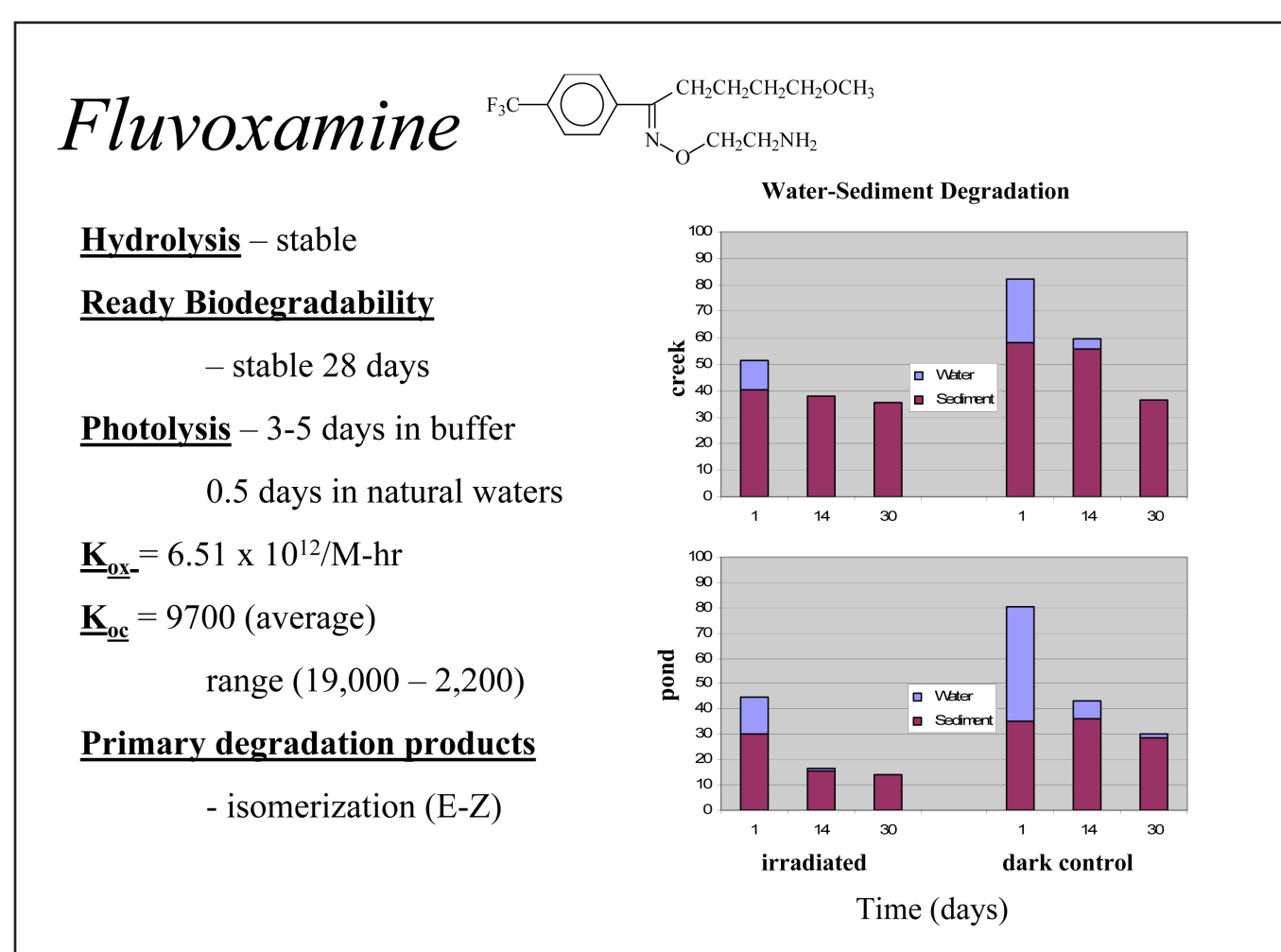
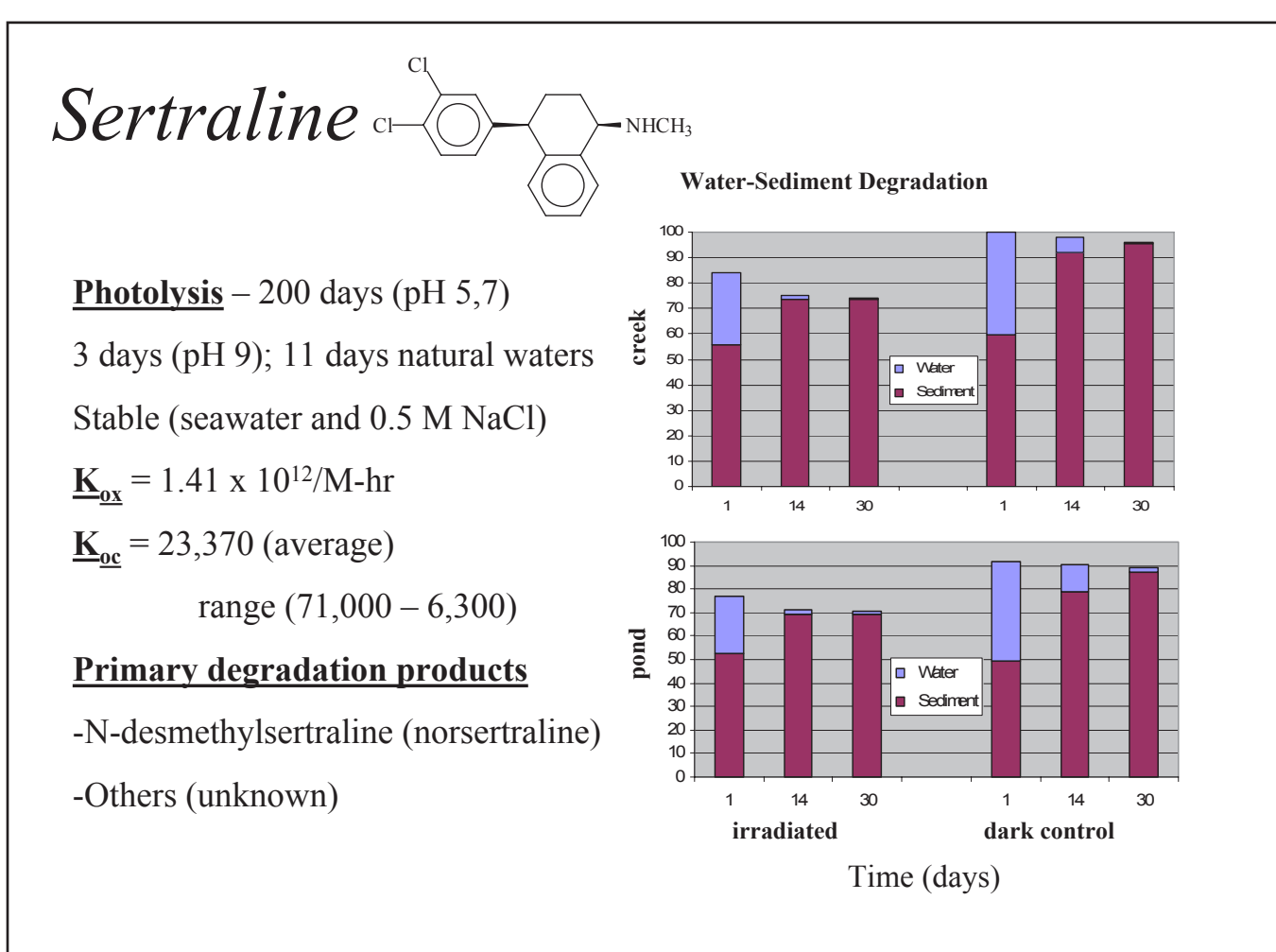
- **The risk assessment paradigm used for pesticides should be valid for PPCPs and EDCs that may be present in wastewater and biosolids.**

## What we did:

- **Laboratory environmental fate investigations similar to those used for pesticide registration were conducted on a class of pharmaceutical compounds.**
- **Concentrations SSRIs in wastewater influent, effluent, and stream water and sediment upstream and downstream from a WWTP were measured to verify persistence observed in laboratory investigations.**
- **Additionally, concentrations of 4-nonyl phenol (4-NP) were measured in a series of biosolid samples collected from 17 wastewater treatment plants in Georgia, Kansas, South Carolina, Illinois, and Colorado.**

## What we found:

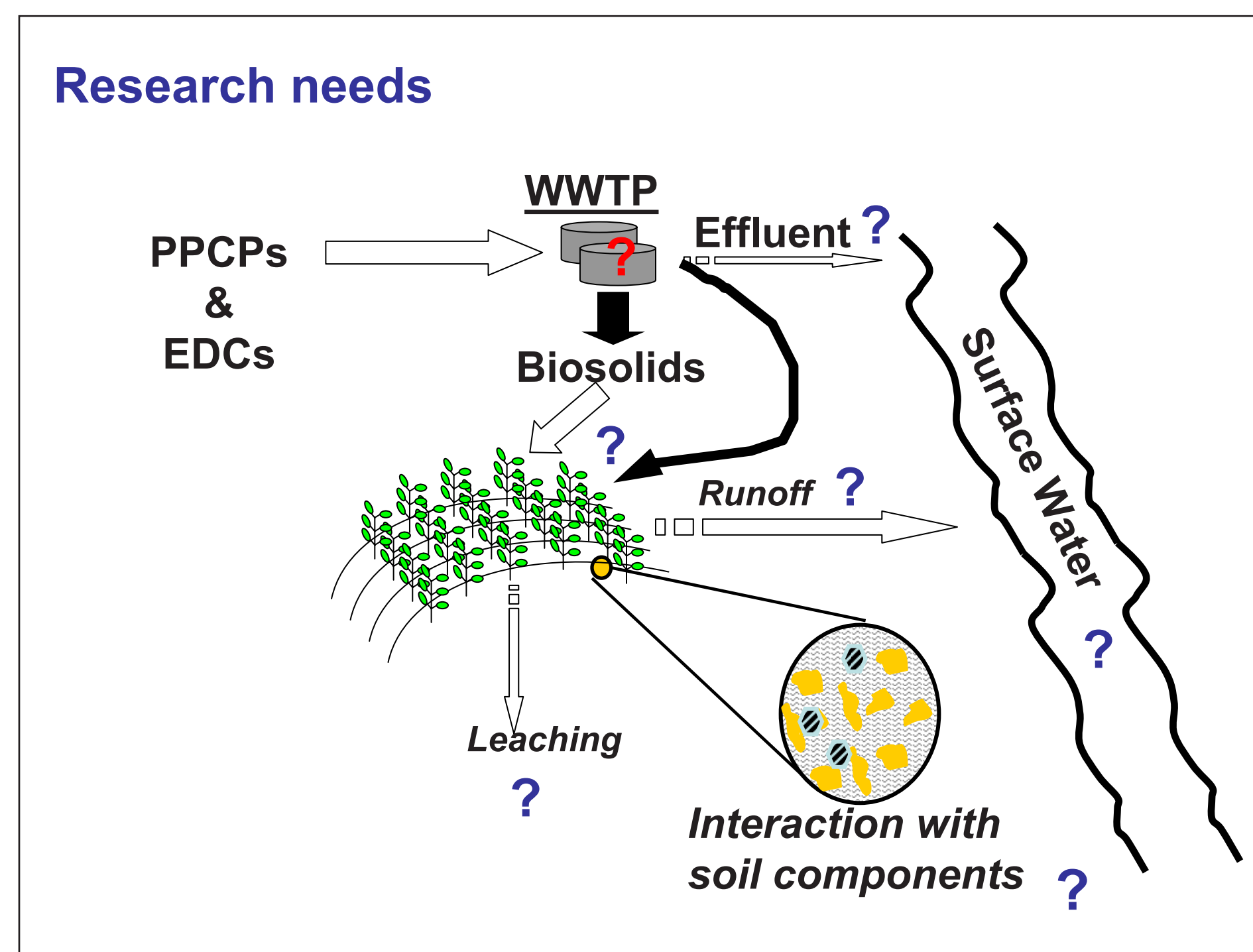
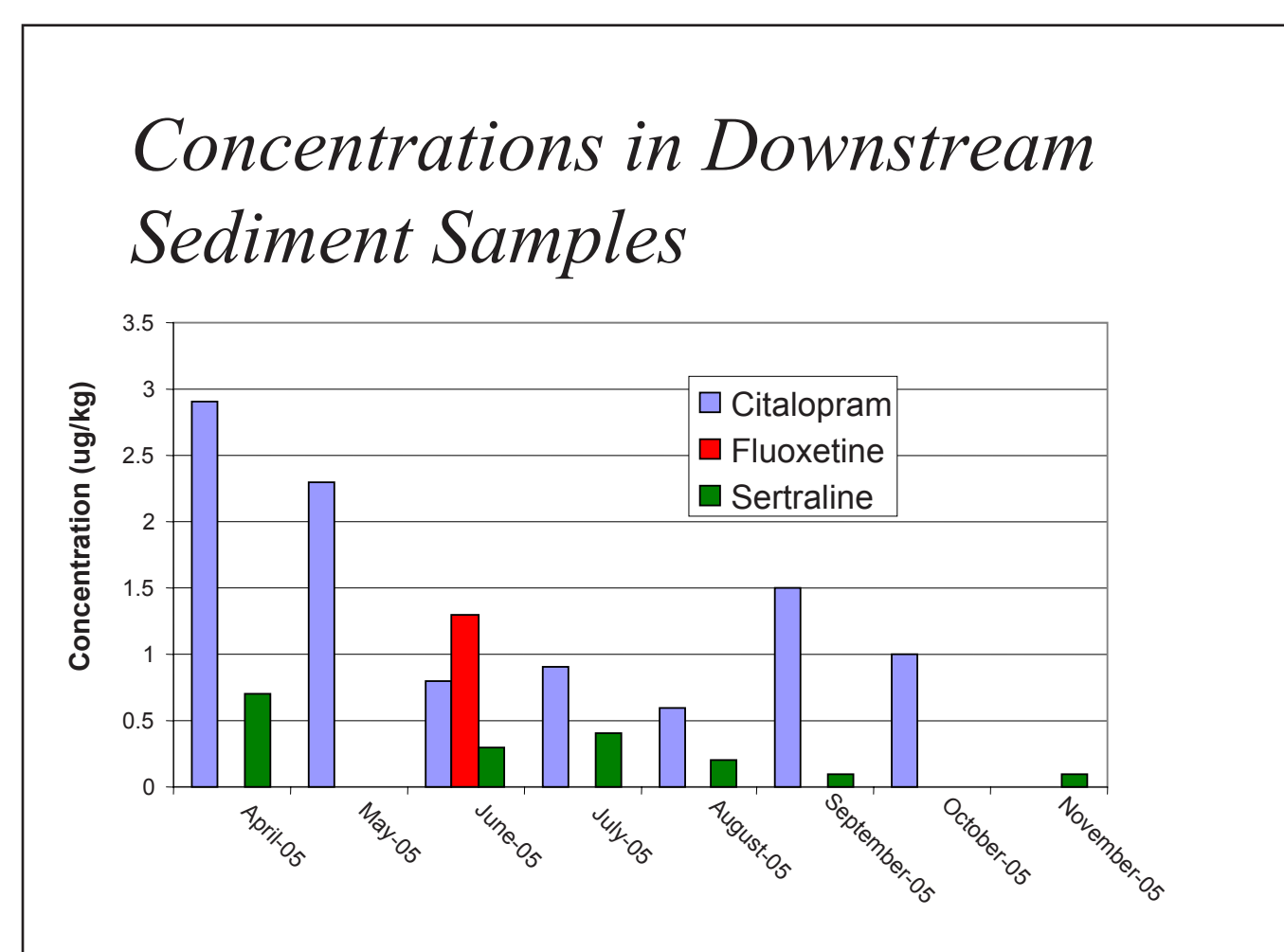
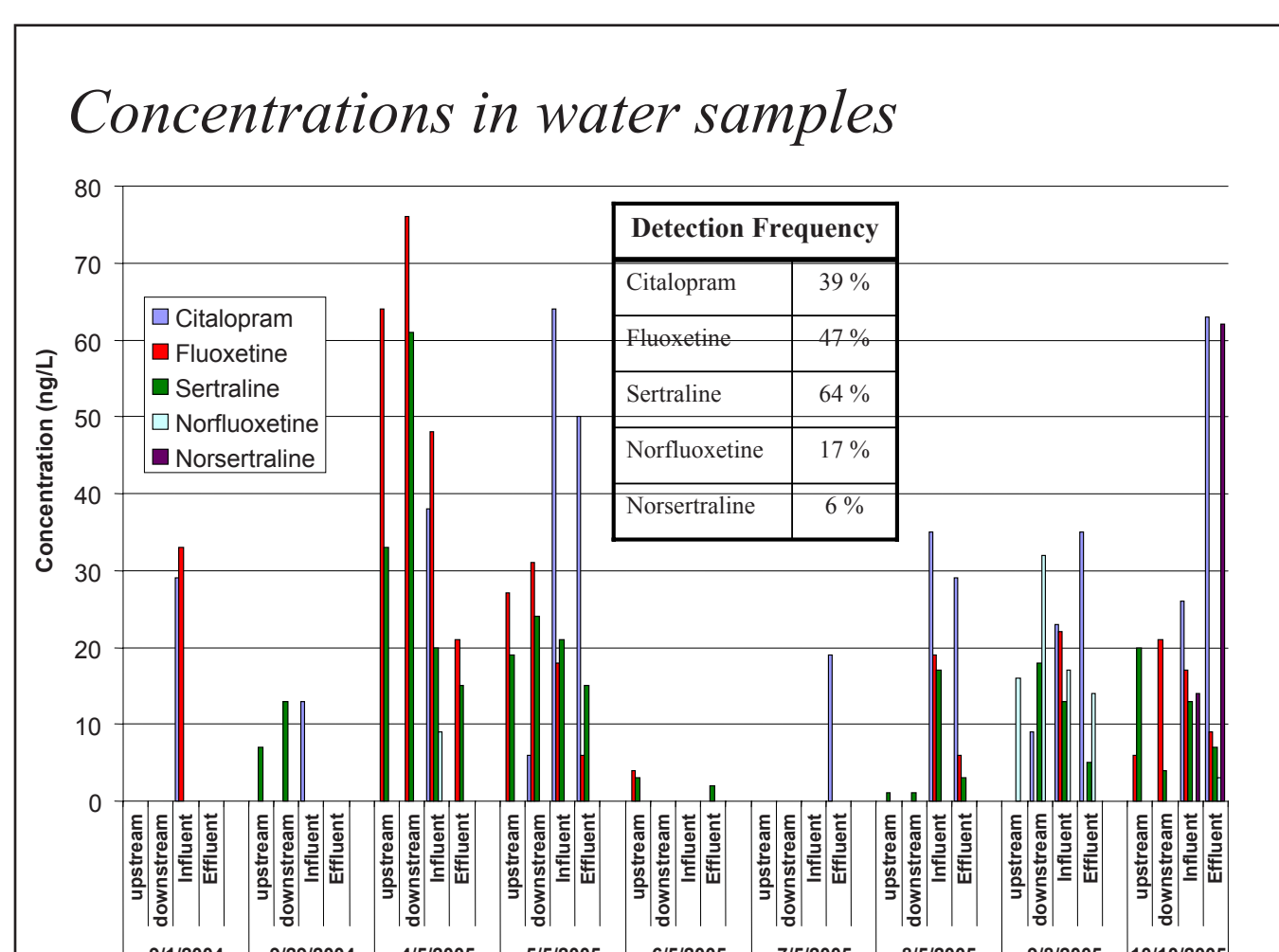
- **Laboratory degradation experiments for SSRIs indicated three of the 5 chemicals tested were persistent and would be expected to be present in wastewater. These data also indicated that these compounds would be found at higher concentrations in sediment.**



- **Compounds that were most persistent in lab experiments were most frequently detected in wastewater effluent, in stream water and sediment receiving treated wastewater effluent.**
- **As predicted by laboratory experiments, higher concentrations of the most persistent compounds were found in sediments.**
- **If these compounds were pesticides, ecological risk assessments would be dominated by sediment toxicity criteria.**

## What is next??

- **Fate and disposition of PPCPs and EDCs associated with biosolids in agricultural field settings.**
- **Presence of PPCPs and EDCs in fish exposed to waters receiving WWTP effluent.**
- **Fate in seawater and marine sediments: Ultimately all waters flow into the ocean.**



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